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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,626	11/29/2001	Hiroyuki Watanabe	111242	2316

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EXAMINER

MARSCHER, ARDIN H

ART UNIT	PAPER NUMBER
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1631

DATE MAILED: 07/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,626

Applicant(s)

WATANABE ET AL.

Examiner

Ardin Marschel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 8-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Applicant's election with traverse of Group I, Specie B (now claims 1-7 and 14-17) in Paper No. 6, filed 4/10/03, is acknowledged. The traversal is on the ground(s) that claim 1, on its face, is not limited to contacting a carbon nanotube electrode with a fully pre-made biopolymer and includes contacting partially-formed biopolymer as well as synthesizing a biopolymer onto a carbon nanotube electrode. This is not found persuasive because the contacting step of instant claim 1 is a distinct step therein which, on its face, occurs when said contact occurs. Such a contact occurrence then requires that what is contacting the electrode is a biopolymer and not a monomer which later is further modified by adding one or more monomers to result in a biopolymer. Such addition(s) of other monomers necessarily occurs after the initial contact. Additionally such addition(s) of monomers does not contact the electrode but rather contacts whatever first monomer or linker that has already contacted the electrode in the building up of the desired biopolymer. Therefore, applicants' traversal argument that instant claim 1 encompasses biopolymer synthesis in the contacting step conflicts with the contacting wording in the claim and does not, on its face, persuasively support the alleged synthetic method steps as argued by applicants. Applicants then allege that there is no undue search burden regarding searching all of the instantly pending claims and species together. In response this allegation has not negated or even argued why the basis for the restriction groupings and species as set forth in the previous office action, mailed 3/10/03, fails to support the restriction and specie election requirements. Therefore, these arguments are allegations without factual support which are non-

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persuasive, compared to the factual support for the restriction and specie election requirements set forth in the previous office action, mailed 3/10/03.

The requirement is still deemed proper and is therefore made FINAL.

NOT FURTHER LIMITING CLAIM

Claim 17 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

As described above in the response to the restriction/election requirement, the contacting step in instant claim 1 sets forth what specifically contacts the electrode in the claimed production method as being a biopolymer. Such a characterized composition must already be a biopolymer at the moment of contacting which also is what is meant in claim 17 as a existing biopolymer. Thus, claim 17 is not further limiting from claim 1.

VAGUENESS AND INDEFINITENESS

Claims 1-7 and 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 1, the method is directed to production of an electrical connection structure. Line 3 of claim 1 provides a nanotube electrode but does not describe or set forth any limitation of any electrical connection. Line 4 of claim 1 sets forth the contacting of the electrode with a generic biopolymer but yet also not directing the

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method to making any electrical connection. Even the biopolymer lacks any electrical properties to which electrical connectivity may occur. The biopolymer which is contacted to the electrode also lacks the formation of a connection thereto. The biopolymer contacting in line 4 of claim 1 may merely bounce off the electrode as in situations where diffusion of biopolymers in a sample solution contact an electrode briefly in some type of biosensor practice without the formation of a bond or connection. Therefore, claim 1 is vague and indefinite as to whether the preamble citation of an electrical connection controls the metes and bounds of the claim or whether the actually recited steps in lines 3 and 4 control the metes and bounds. Claim 14 also contains this unclarity via citing a biopolymer without any required electrical properties thus resulting in an unclear claim practice as to what electrical connection is made by the claimed method. Claims dependent directly or indirectly from claims 1 or 14 are also rejected hereinunder due to their dependence therefore being inclusive of the unclarity thereby. Clarification via clearer claim wording is requested.

PRIOR ART

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 14, 16, and 17 are rejected under 35 U.S.C. 102(b) and (e)(2) as being clearly anticipated by Massey et al. (P/N 5,866,434).

Massey et al. discloses the practice of attaching graphitic nanotubes to solid phases which surface components listed as starch, dextrans, proteins, and organic polymers as set forth in column 19, lines 9-25. This is a type of contacting as instantly claimed which may be reasonably interpreted as indirect contacting. It is noted that none of the above listed instant claims are limited such that the contacting must occur without a linking intermediate such as a particle or solid phase as disclosed in Massey et al. in said column 19 citation. The elected polar biopolymer limitation for the instant subject matter is anticipated in that proteins are well known to contain polar amino acid groups. In order to document such polar group content in proteins, the reference of Lehninger (1970) is cited in that pages 67-71 describes the content of proteins with polar groups clearly set forth on pages 68, 70, and 71. It is also noted that the instant claims cite a carbon nanotube as an electrode. This is reasonably interpreted that a carbon nanotube may function as an electrode whether this property is utilized in a reference or not.

Alternatively, the nanotubes may be functionalized as disclosed in the reference in column 18, line 45. The functionalization is described in column 18, lines 46-60, as being of the types utilized as binding components in assays. Such binding components are listed in column 16, line 45, through column 17, line 3, via a long list of biopolymers such as antibodies; nucleic acids, enzymes, etc. all of which are well known to contain polar groups as the instantly elected subject matter. Thus, the functionalization, or

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production as instantly claimed, of these functionalized nanotubes anticipates the above listed instant claims wherein direct contact and attachment of desired biopolymers is practiced.

The electrical connection of carbon fibrils or nanotubes to electrodes wherein electrical current is applied is also disclosed in Massey et al. in column 41, lines 27, through column 42, line 47, as instantly claimed in claim 2 with a range of voltages as cited in column 42, line 63, which clearly are inclusive of the voltages of instant claim 3.

In the reference in columns 27-29, various polar end groups are prepared on the carbon fibrils utilized therein for attachment to binding components etc. as required in instant claims 6 and 16. Amines and cyanide linkage groups are polar groups as disclosed in the reference, for example.

Massey et al. (P/N 6,362,011) is cited on the enclosed PTO Form 892 as being of interest due to being cumulative to the above rejection.

Claims 1, 2, 4, 5, 7, 14, and 17 are rejected under 35 U.S.C. 102(e)(2) as being clearly anticipated by Davey et al. (P/N 6,576,341).

Davey et al. discloses the preparation of compositions which include nanotubes in column 2, line 66, through column 3, line 22, wherein carbon nanotubes are clearly cited. This section also discloses the conjugation of these carbon nanotubes with organic materials. Such organic materials include polymers such as DNA as cited in column 3, lines 27-32. Methods of production and a multitude of uses including electrical conduction of nanotube composites are disclosed in column 5, line 45, through

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column 9, line 34, as well as in columns 1-2 regarding other known carbon nanotube preparatory methods. These disclosures anticipate the above listed instant claims.

INFORMALITIES

The disclosure is objected to because of the following informalities:

In claim 2, line 2, the word "contacing" appears to be misspelled..

Appropriate correction is required.

No claim is allowed.

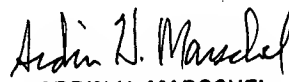
Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The CM1 Fax Center number is either (703)308-4242 or (703)305-3014.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ardin Marschel, Ph.D., whose telephone number is (703)308-3894. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, Ph.D., can be reached on (703)308-4028.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instrument Examiner, Tina Plunkett, whose telephone number is (703)305-3524 or to the Technical Center receptionist whose telephone number is (703) 308-0196.

July 25, 2003


ARDIN H. MARSCHEL
PRIMARY EXAMINER